Maldistribution in air-water heat pump evaporators. Part 2: Economic analysis of counteracting technologies - DTU Orbit (09/11/2017)

Maldistribution in air-water heat pump evaporators. Part 2: Economic analysis of counteracting technologies

In this study a methodology is applied to quantify the effect of evaporator maldistributionon operating costs of airewater heat pumps. The approach is used to investigate the cost-effectivenessof two technologies enabling to counteract maldistribution: a flash gasbypass setup and the individual superheat control in parallel evaporator channels. In thetotal cost of ownership analysis, different scenarios for climatic conditions, severity ofmaldistribution, and economic framework are considered. Results show that the flash gasbypass system is cost-effective only in a few conditions, namely severe maldistribution,high electricity prices, and colder climate. Investment in the individual superheat controltechnology, however, can be quickly amortized in many scenarios. For the warmer climatezone with a small number of operating hours counteracting of maldistribution does notpay off under the used economic assumptions.

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